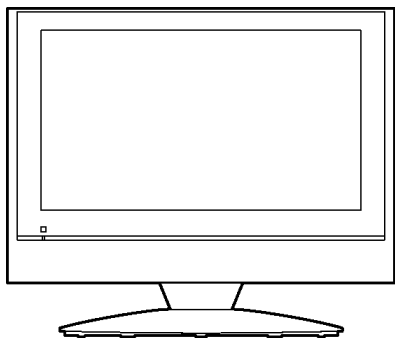


Service Manual

Wide LCD TV



TX-22LX2

LH35 Chassis

Power Source

AC 220-240V, 50/60Hz

Power Consumption

Average use: 90W

Standby condition: 1.3W

LCD

Wide XGA (1,280 × 720 pixels)

16 : 9 aspect ratio LCD panel

Screen Size

487.7mm(W) × 274.3mm(H)

Sound

Speaker

12cm × 4cm, 2pcs, 16Ω

Audio Output

6W (3W + 3W), 10% THD

Headphones

M3 (3.5 mm) Jack × 1

Receiving Systems/ Band name

PAL I

UHF E21 - 68.

PAL 525/60

Playback of NTSC tape from some PAL Video recorders (VCR).

M. NTSC

Playback from M. NTSC Video recorders (VCR).

NTSC (AV input only)

Playback from NTSC Video recorders (VCR).

Aerial-Rear

UHF

Operating Conditions

Temperature: 5°C-35°C

Humidity: 5%-90% RH (non-condensing)

Connection Terminals

AV1 (Scart connector)

21 Pin terminal (Audio/Video in, Audio/Video out, RGB in, Q-Link)

AV2 (Scart connector)

21 Pin terminal (Audio/Video in, Audio/Video out, S-Video in, Q-Link)

AV3

VIDEO

RCA PIN Type × 1

S-VIDEO

Mini DIN 4-pin

AUDIO L-R

RCA PIN Type × 2

Dimensions (W × H × D)

Including TV Stand

592mm × 503.1mm × 260mm

TV Set Only

592mm × 420mm × 99mm

Weight

10kg Net

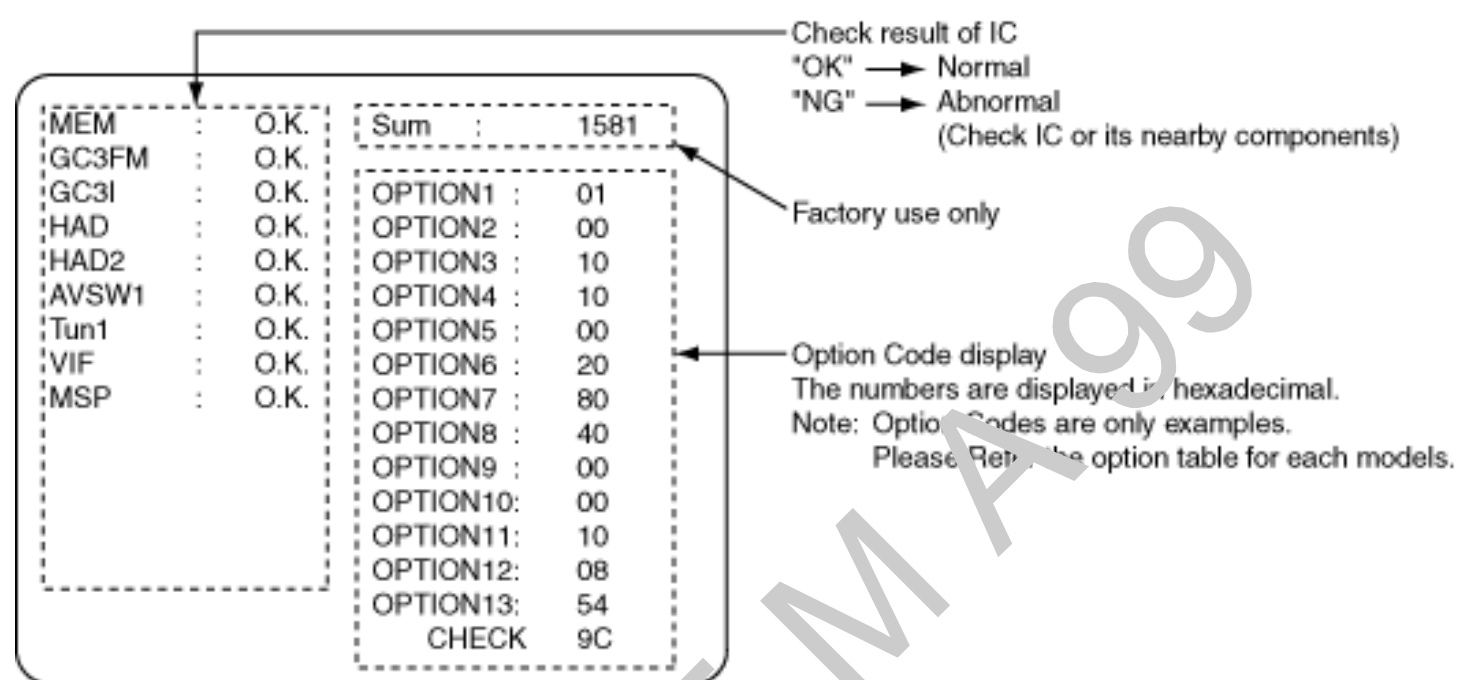
Note:

Design and Specifications are subject to change without notice.
Weight and Dimensions shown are approximate.

4 Self Check

[TOP](#) [PREVIOUS](#) [NEXT](#)

1. Self-Check is used to automatically check the bus lines and hexadecimal code of the TV set.
2. To get into the Self -Check mode press the [Down](#) () button on the customer controls at the front of the set, at the same time pressing the [Recall](#) button on theremote control, and the screen will show :
3. Turn off the TV to reset JPEG Viewer circuit after SELF-CHECK.



If the CCU ports have been checked and found to be incorrect or not located then "--" will appear in place of "O.K."

Display	Ref.No.	Description	P.C.B.
MEM	IC1107	EEPROM	DG-Board
GC3FM	IC4017	Global Core MAIN	DG-Board
GC3I	IC4003	Global Core	DG-Board
HAD	IC4001	SCART RGB A/D Converter	DG-Board
HAD2	IC4002	OSD RGB A/D Converter	DG-Board
AVSW1	IC3001	AV Selector	A-Board
Tun1	TU101	Tuner	B-Board
MSP	IC2501	Stereo Decoder	A-Board

[TOP](#) [PREVIOUS](#) [NEXT](#)

8.1 How to enter SERVICE 1

[TOP](#) [PREVIOUS](#) [NEXT](#)

1. In main menu, move to choose sound menu, set BASS to MAXIMUM, and set TREBLE to MINIMUM.
2. Simultaneously press [INDEX](#) button on remote control and [DOWN](#) button [] on the TV set.

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SCHEMA 99

8.2 How to enter SERVICE 2

[TOP](#) [PREVIOUS](#) [NEXT](#)

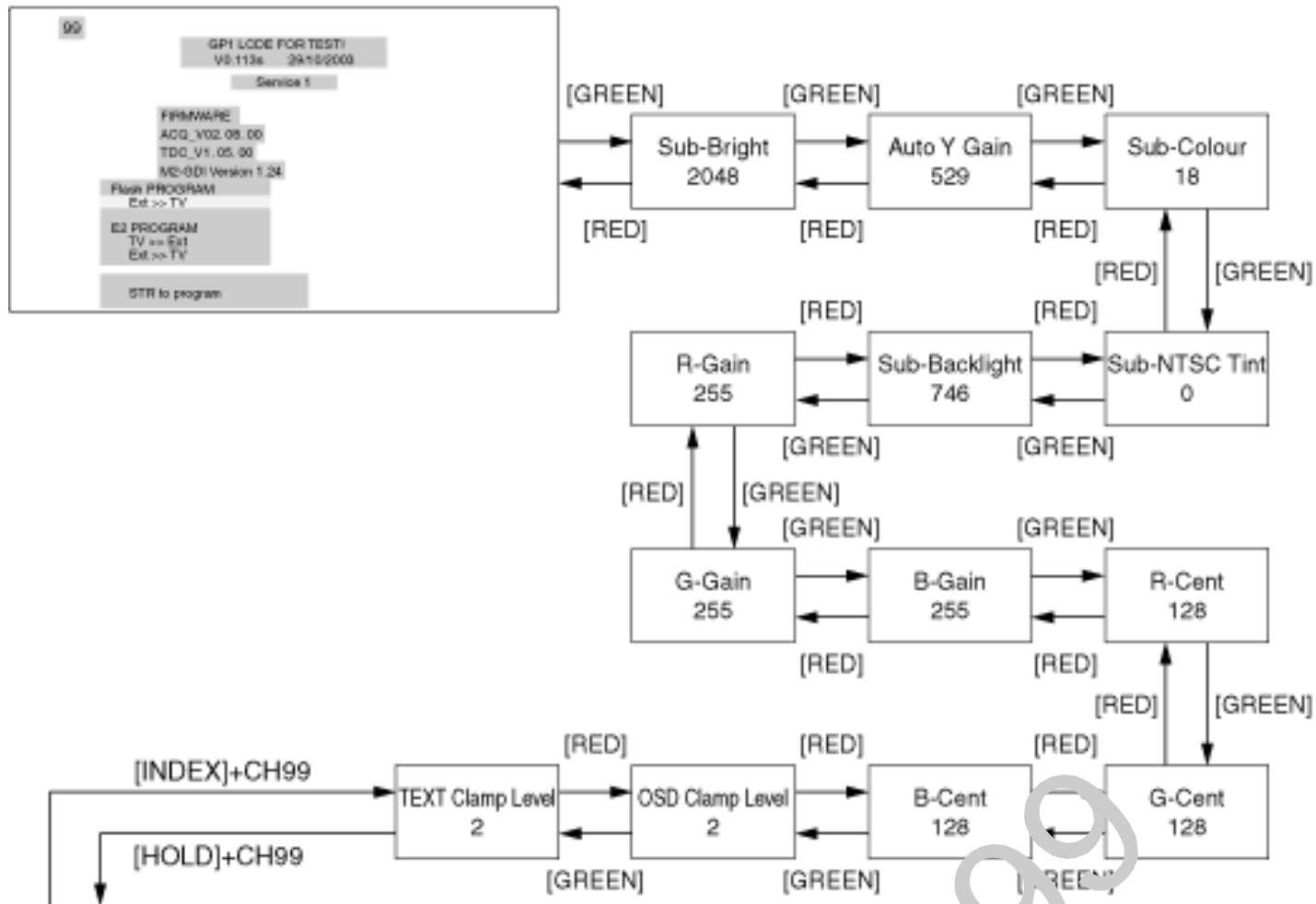
1. Select the TEXT Clamp Level (service 1).
2. Set the channel to CH99.
3. Press HOLD button on remote control.

Note:

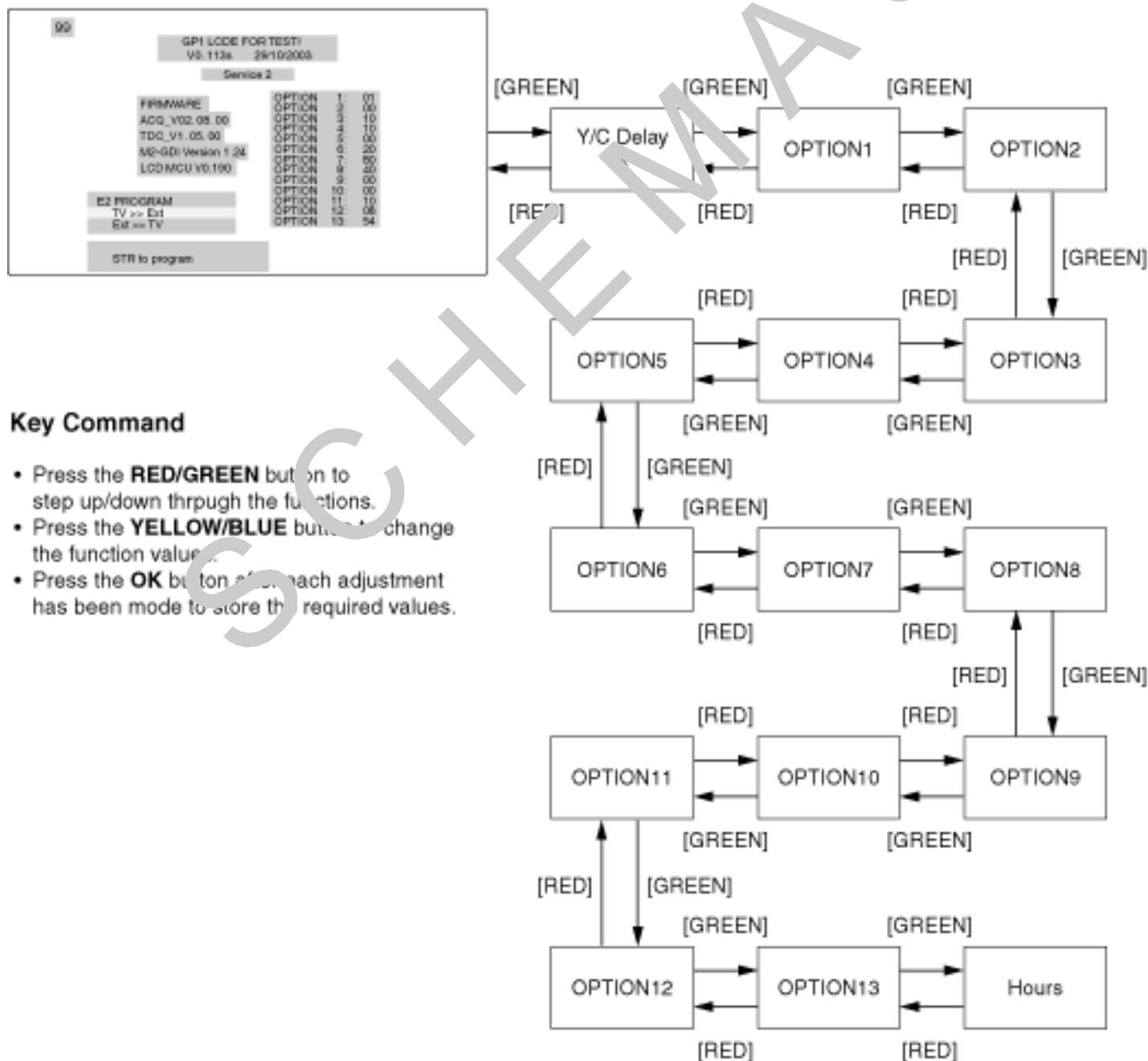
To exit to Service mode, press N or Power button on remote control.

SCHEMA 99

SERVICE 1



SERVICE 2



Key Command

- Press the **RED/GREEN** button to step up/down through the functions.
- Press the **YELLOW/BLUE** button to change the function value.
- Press the **OK** button after each adjustment has been made to store the required values.

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8.3 Option Description

[TOP](#) [PREVIOUS](#) [NEXT](#)

option1		01	
b0	1	Colour system	Auto(1)
b1	0		SECAM(1)
b2	0		NTSC(1)
b3	0		M.NTSC(1)
b4	0	free	
b5	0	free	
b6	0	free	
b7	0	PicMenu 3D-Comb	SetupMenu(0)/PictureMenu(1) [except UKmodel(fixed PictureMenu)]
option2		00	
b0	0	CH Plan	ASIA / M.E. / HK/UK / CHINA(1)
b1	0		NZ/INDNES(1)
b2	0		AUSTRALIA(1)
b3	0		E.EUROPE(1)
b4	0		SPECIAL(1)
b5	0		AMERICA(1)
b6	0		CATV(1)
b7	0		JAPAN(1)
option3		10	
b0	0	sub picture	without sub-picture (0), with sub-picture (1)
b1	0	2tuner	2tuner(1), 1tuner(0)
b2	0	VGA	enable(1)
b3	0	AV5	enable(1)
b4	1	Wde (16:9)	16:9 (1), 4:3 (0) (change multi window/aspect operation)
b5	0	JPEG	enable(1)
b6	0	SIF	I only(0), BG only(1)
b7	0		I/BG/DK/L(2), BG/DK(3)
option4		10	
b0	0	A2 enable	enable(1)
b1	0		not use
b2	0		not use
b3	0		not use
b4	1	NICAM enable	enable(1)
b5	0		not use
b6	0		not use
b7	0		not use
option5		00	
b0	0	A2 select 6.5MHz	5.742MHz(0) 6.742MHz(1)
b1	0	NICAM priority	ASIA/M.E.(1)
b2	0		HK/UK(1)
b3	0		CHINA(1)
b4	0		NZ/INDN(1)
b5	0		AUSTRA(1)
b6	0		E.EURO(1)
b7	0		SPECIAL(1)
option6		20	
b0	0	Ext. HV input	without HV input(0) / with HV input(1)
b1	0	SASO enable	SASO enable(1)
b2	0	Noise mute	Noise mute enable(0)
b3	0	Monitor out AV1 mute	Monitor out AV1 mute(1)
b4	0	Tuner no refresh	Refresh tuner (0), no refresh (1)
b5	1	Tuner	SACO tuner (1), Others (0)
b6	0	HYPERS	UHF only (0), UHF/VHF (1)
b7	0	IF I2C	I2C controlled Tuner IF module(1)
option7		80	
b0	0	Power up EC mode	Power on EC enable (1)
b1	0	CH Blanking	Blanking enable (1)
b2	0	AV Blanking	Blanking enable (1)
b3	0	Auto WIDE	WSS enable only in aspect Auto (0), WSS always enable (1)
b4	0	Volume correction	TV Volume correction enable (1)
b5	0	Q-Link	Q-Link off selectable in menu (1)
b6	0	MPX/NICAM display	Display NICAM (0), Display MPX (1)
b7	1	Owner ID	not use

option8	40		
b0	0	Teletext CH Refresh	not use
b1	0	Geomagnetic Sensor	Geomagnetic sensor enable(1)
b2	0	Geomagnetic Polarity	Geomagnetic polarity +(0), -(1)
b3	0	RF Attenuation	Enable(1)
b4	0	Fine tuning	Enable(1)
b5	0	Search speed	Slow(1) Fast(0)
b6	1	TEXT	Enable(1)
b7	0	TEXT TOP	TOP enable (1)
option9	00		
b0	0	Jpeg auto start	enable (1)
b1	0	3D Subwoofer	Subwoofer enable (1) Dolby model should be 0.
b2	0	Dolby Virtual	Dolby Virtual enable (1)
b3	0	Amp	with Amp(0) / without Amp(1)
b4	0	SoundExt DA	without SoundExt DA(0) / with SoundExt DA(1)
b5	0	shipping Sound menu	MUSIC(0) / CINEMA(1)
b6	0	Volume curve	Volume curve1(0), curve2(1)
b7	0	LIPSYNC	LIPSYNC enable (1)
option10	00		
b0	0	OSD language	not use
b1	0	ACI all country / Lang	ACI enable(1), only Netherlands(0)
b2	0	ACI auto MP	ACI auto multi package enable (1)
b3	0	ACI offset	ACI offset for VCR prog. enable(1)
b4	0	Blue Back	not use
b5	0	Auto Aspect	Reserved
b6	0	Protect XPR	Reserved
b7	0	Protect 5V detect	Protection input enable(1)
option11	10		
b0	0	Acuity Demo	enable(1)
b1	0	Picture Shift	enable(1)
b2	0	Shop mode	enable(1)
b3	0	User aspectJust	enable(1)
b4	1	User aspect 14:9	enable(1)
b5	0	NICAM C4 bit	enable(1)
b6	0	ID-1	enable(1)
b7	0	1080i	enable(1)
option12	08	Option	
b0	0	Asia	Asia(1),europe(0)
b1	0	Australia	not use
b2	0	Ireland /India	Ireland(1)
b3	1	UK	UK(1)
b4	0	MELCOA	not use
b5	0	28 inch	not use
b6	0	Large size	not use
b7	0	free	
option13	54	Temporary	
b0	0	Jpeg Burn Protect	Enable(0), Disable(1)
b1	0	Tuner IF 38.9	38.9MHz(0), 39.5MHz(1) (UK, Ireland)
b2	1	NewALBD	Zoom1 or Zoom3 (0) Zoom1 or 14:9 (1)
b3	0		Enable(1)not use
b4	1	Viewing Mode	Each Mode(1) / Each Source(0)
b5	0	TEXT refresh for Euro	enable(0), disable when TV
b6	1	Still	enable(1)
b7	0	PicMenu AI/MPEG	Enable(1) (except UKmodel (fixed Disable))

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9.1.1 RF video

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Instrument Name	Connect to	Remarks
Remote controller Internal signal (studio color bar)	RF input	

1. Receive full color bar by RF signal input.

(Aspect mode : wide, Viewing mode: standard, LCD AI: OFF)
2. Go to "Auto Y Gain" under Service 1 and make automatic adjustment of video signal level by the blue key.
 - ı When Service 1 appears, presetting takes place automatically as shown below.
 - ı Sharpness: 0
 - ı AI: OFF
 - ı 3D-Comb filter: On
3. Press STR key to write the value of adjustment results to EEPROM.
4. Check that the automatic adjustment of video signal level has completed normally.
 - ı When the adjustment is completed normally, the "Auto Y Gain" color turns black.

Note:

In the adjustment mode, the M2 MCU changes automatically to the mode shown in the left.

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9.2 WB Adjustment

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Instrument Name	Connect to	Remarks
1. Remote controller 2. LCD WB meter (Minolta CS-1000 equivalent) 3. Communication jig 4. Computer for external control		Correlation can be also taken by CA-110 or equivalent

- Basically perform checking using the production software and make automatic adjustment using external computer.
 - Let the panel stand for more than 3 hours at more than 20°C.
 - Basically perform assemble to completion in the ambient environment of room temperature more than 20°C.
 - The aging time is more than 20 min at above room temperature.
- Enter into WB adjustment in the plant adjustment mode and measure the WHITE brightness data to check that it is higher than 400 cd /m2

(When it is below 400 cd /m2, make re-measurement in 30 minutes after cold-on.)
 - For the Excel calculation sheet, use "LX1 series, calculation software".
 - Using the jig, measure the brightness and chromaticity coordinates of single colors, white, red, green and blue, at the maximum brightness (using basic data) and calculate the gamma data corrected at the maximum brightness using Excel calculationsheet on the external computer.
 - Write the values calculated in 3 above in the gamma data part in EEPROM.

EEPROM Adr :

0C58h - 0C5Bh, 0C5Ch - C5Fh ...R(color temperature Normal)

0C08h - 0C0Bh, 0C0Ch - 0C0Fh ...G(color temperature Normal)

0C30h - 0C33h, 0C34h - 0C37h ...B(color temperature Normal)

- Reflect the data in 4 above and select gray and measure the brightness and chromaticity coordinate at that time and calculate the gamma data (color temperature, normal) and cool and warm color temperatures, corrected at half-tone, using theexternal computer.
- Write the values calculated in 5 above in the gamma data part in EEPROM.

EEPROM Adr:

0C58h - 0C5Bh, 0C5Ch - 0C5Fh ...R(color temperature Normal)

0C08h - 0C0Bh, 0C0Ch - 0C0Fh ...G(color temperature Normal)

0C30h - 0C33h, 0C34h - 0C37h ...B(color temperature Normal)

0C50h - 0C53h, 0C54h - 0C57h ...R(color temperature Warm)

0C00h - 0C03h, 0C04h - 0C07h ...G(color temperature Warm)

0C28h - 0C2Bh, 0C2Ch - 0C2Fh ...B(color temperature Warm)

0C60h - 0C63h, 0C64h - 0C67h ...R(color temperature Cool)

0C10h - 0C13h, 0C14h - 0C17h ...G(color temperature Cool)

0C38h - 0C3Bh, 0C3Ch - 0C3Fh ...B(color temperature Cool)

7. Reflect the data in 6 above and CHECK that the chromaticity coordinates at check and GRAY, are within the values given below.

CHECK: $x = 0.264 \pm 0.005$ $y = 0.269 \pm 0.005$

GRAY: $x = 0.268 \pm 0.005$ $y = 0.267 \pm 0.005$

- ı When writing data into EEPROM, make this procedure after sending the WP (write protect) cancellation command (70 88 00).

Also, WP (write protect) setting command is 70 88 FF.

8. EEPROM DATA saving place for WB (gamma data) backup

<Housing address> <Writing address>

0C18h - 0C1Bh → 0C08h - 0C0Bh

0C1Ch - 0C1Fh → 0C0Ch - 0C0Fh

0C40h - 0C43h → 0C30h - 0C33h

0C44h - 0C47h → 0C34h - 0C37h

0C68h - 0C6Bh → 0C58h - 0C5Bh

0C6Ch - 0C6Fh → 0C5Ch - 0C5Fh

Note:

After completion of adjustment, record the completion time if it took more than 35 minutes after aging.

LCD panels that do not fit in to the above check specification shall be discussed separately.

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11 Block and Schematic Diagrams

11.1. Schematic Diagram Notes

Important Safety Notice

Components identified by $\triangle$ mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.

Notes:

1. Resistor

All resistors are carbon 1/4W resistor, unless marked as follows:
Unit of resistance is OHM [Ω] (K=1,000, M=1,000,000).

2. Capacitor

Unit of capacitance is μ F, unless otherwise noted.

3. Coil

Unit of inductance is μ H, unless otherwise noted.

4. Test Point

 : Test Point position

5. Earth Symbol

 : Chassis Earth (Cold)



: Line Earth (Hot)

6. Voltage Measurement

Voltage is measured by a DC voltmeter.

Conditions of the measurement are the following:

Power Source AC 220-240V, 50/60Hz

Receiving Signal Colour Bar signal (RF)

All customer's controls Maximum positions

7. When arrow mark () is found, connection is easily found from the direction of arrow

8. Indicates the major signal flow. : Video Audio

9. This schematic diagram is the latest at the time of printing and subject to change without notice.

Remarks:

1. The Power Circuit contains a circuit area which uses a separate power supply to isolate the earth connection.

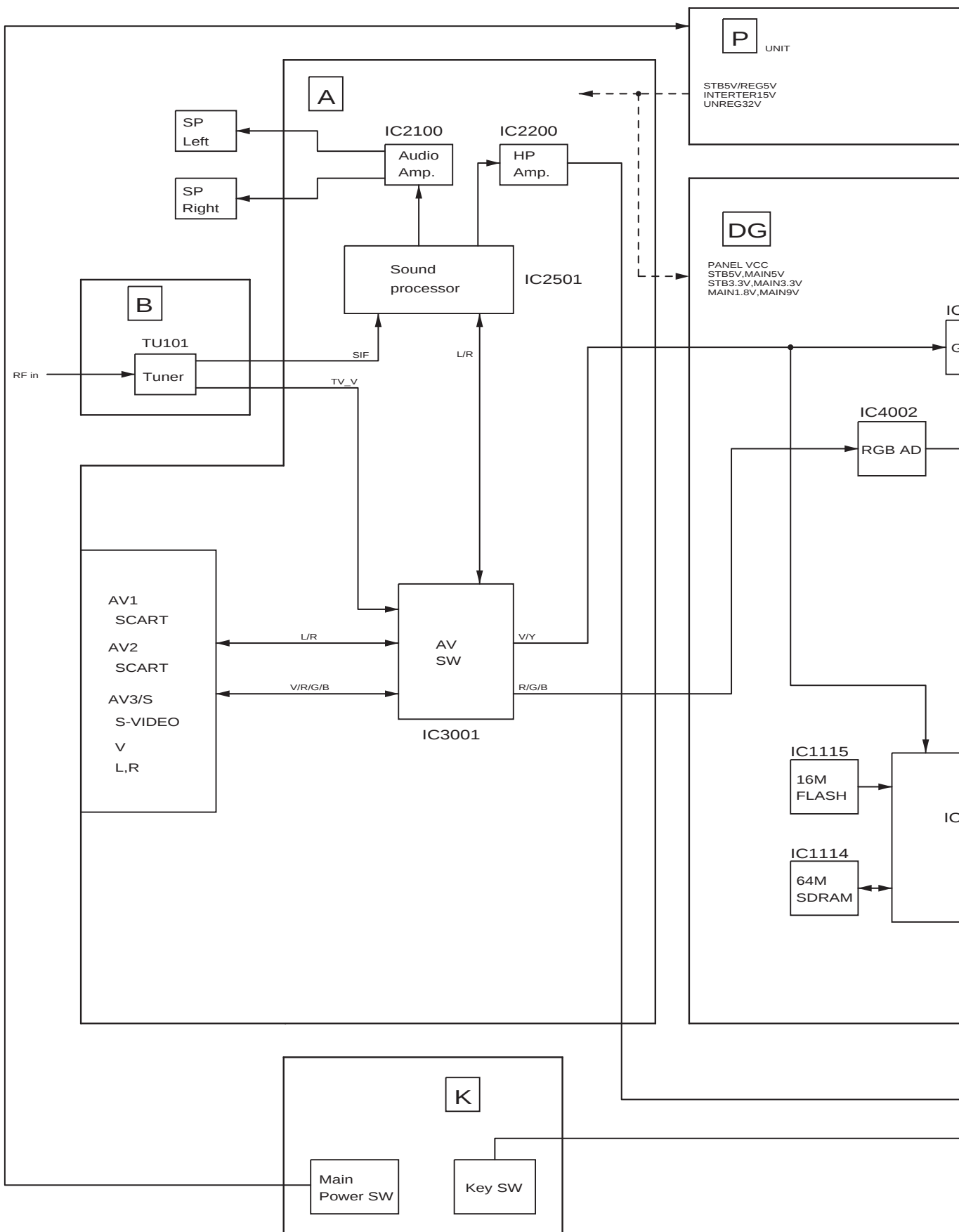
The circuit is defined by HOT and COLD indications in the schematic diagram. Take the following precautions.

All circuits, except the Power Circuit, are cold.

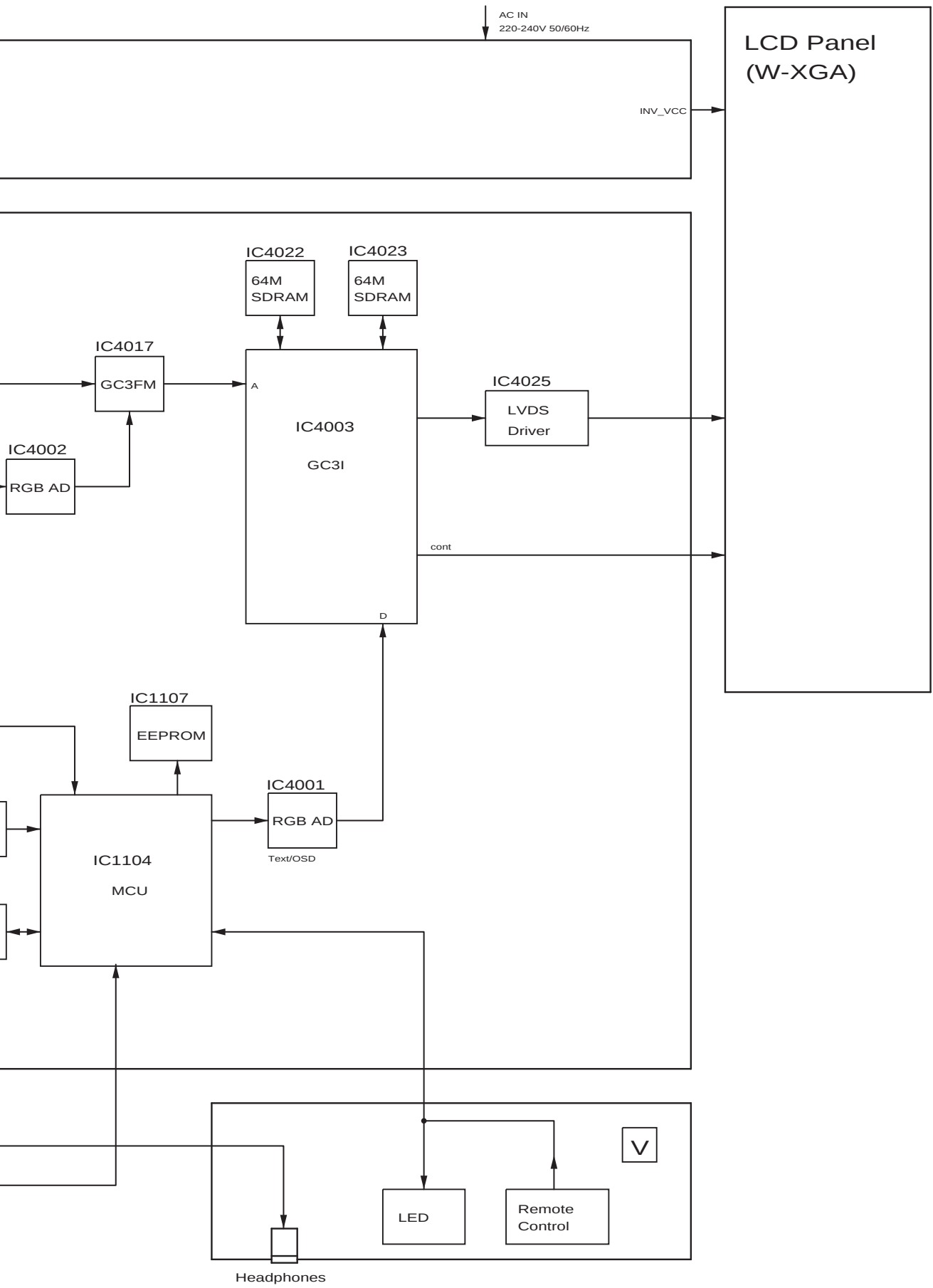
Precautions

- a. Do not touch the hot part or the hot and cold parts at the same time or you may be shocked.
- b. Do not short- circuit the hot and cold circuits or a fuse may blow and parts may break.
- c. Do not connect an instrument, such as an oscilloscope, to the hot and cold circuits simultaneously or a fuse may blow.
Connect the earth of instruments to the earth connection of the circuit being measured.
- d. Make sure to disconnect the power plug before removing the chassis.

11.2. Main Block Diagram

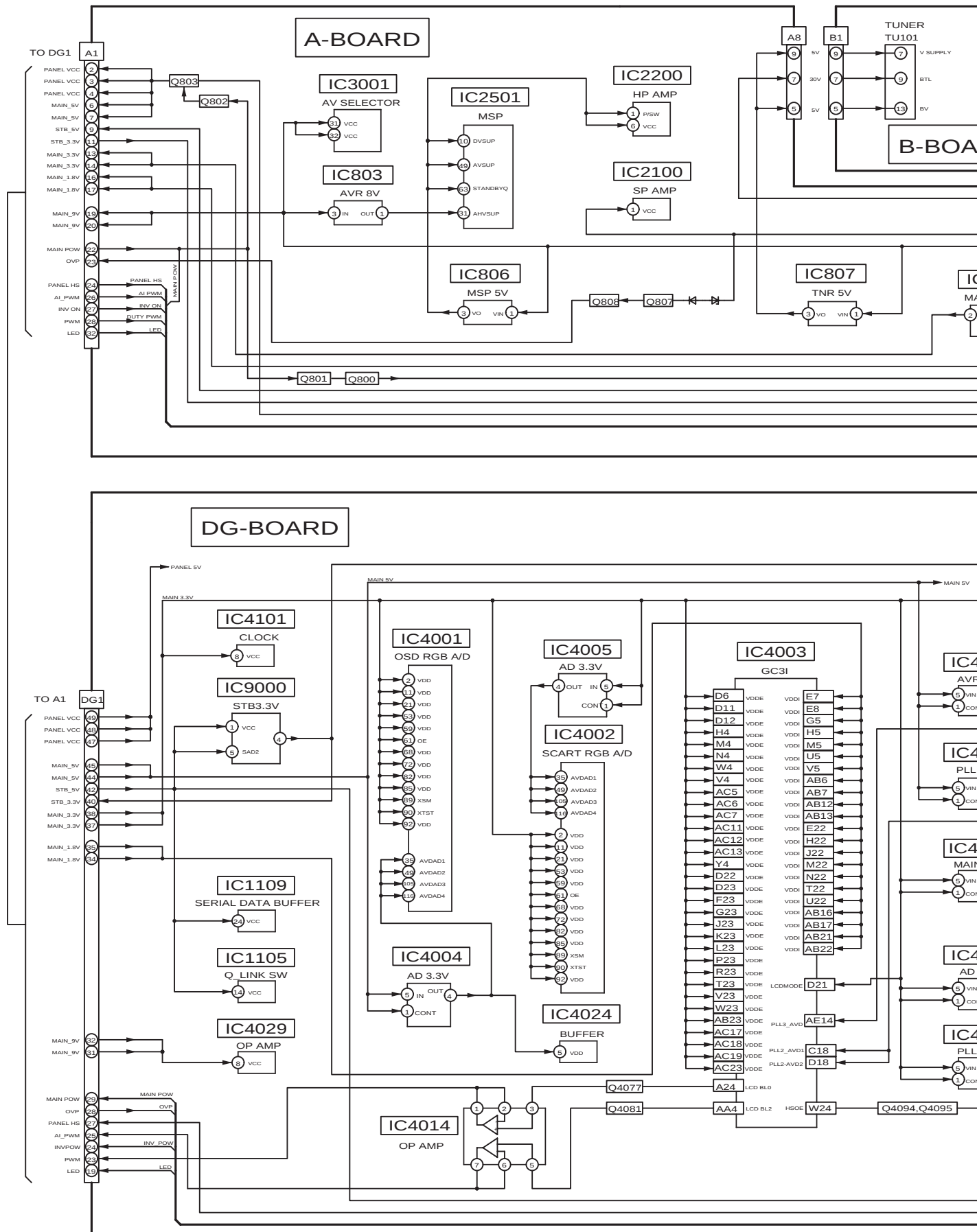


TX-22LX2
Main Block Diagram

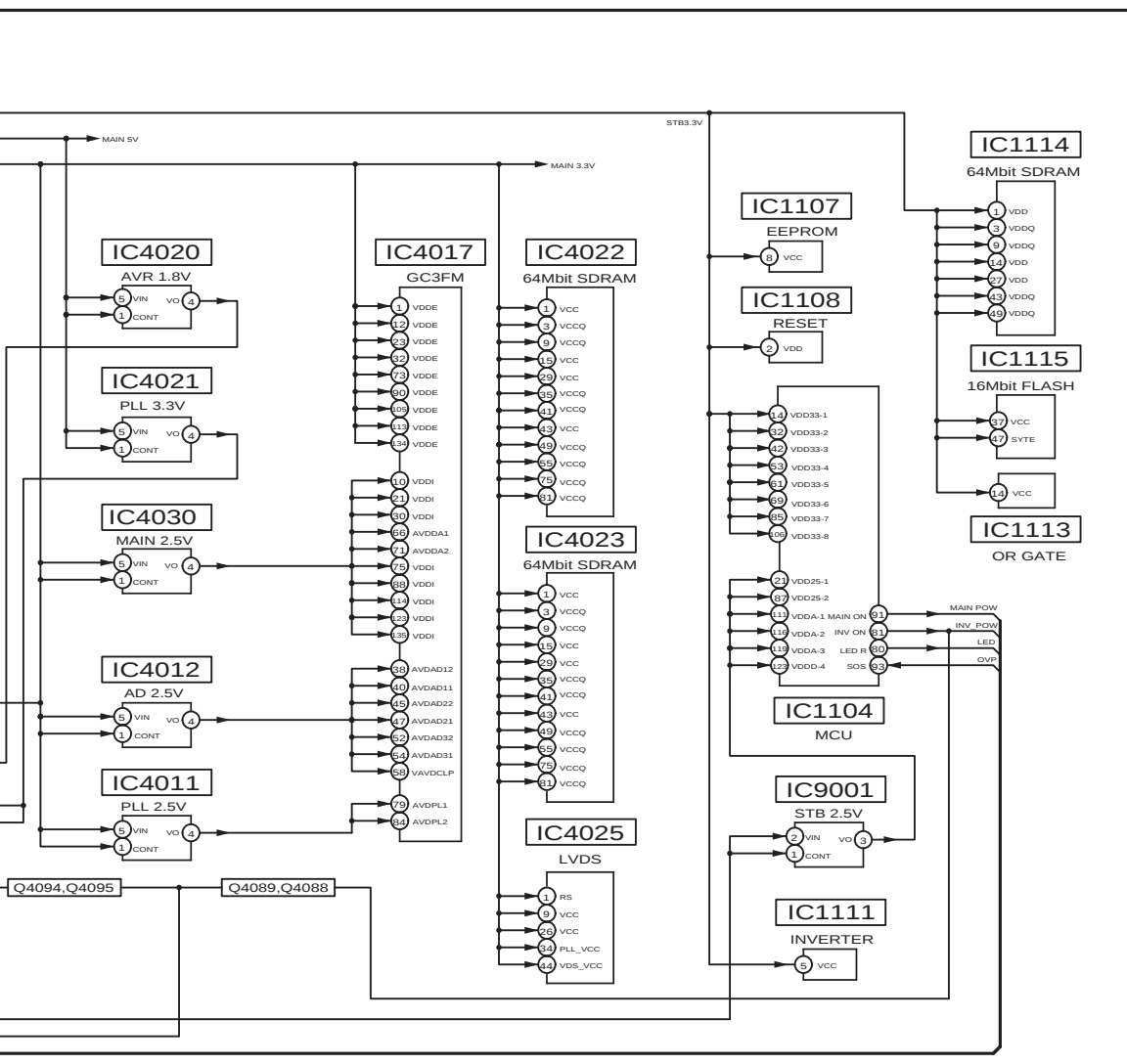
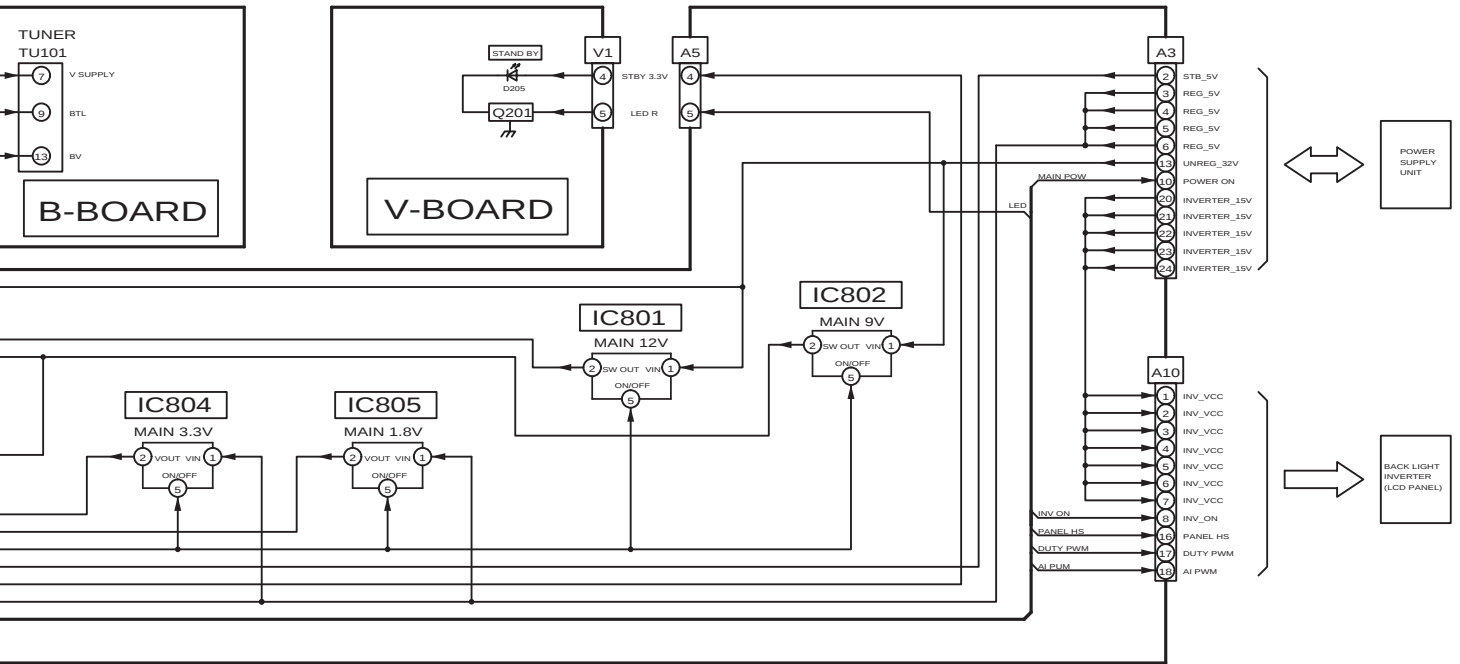


TX-22LX2
Main Block Diagram

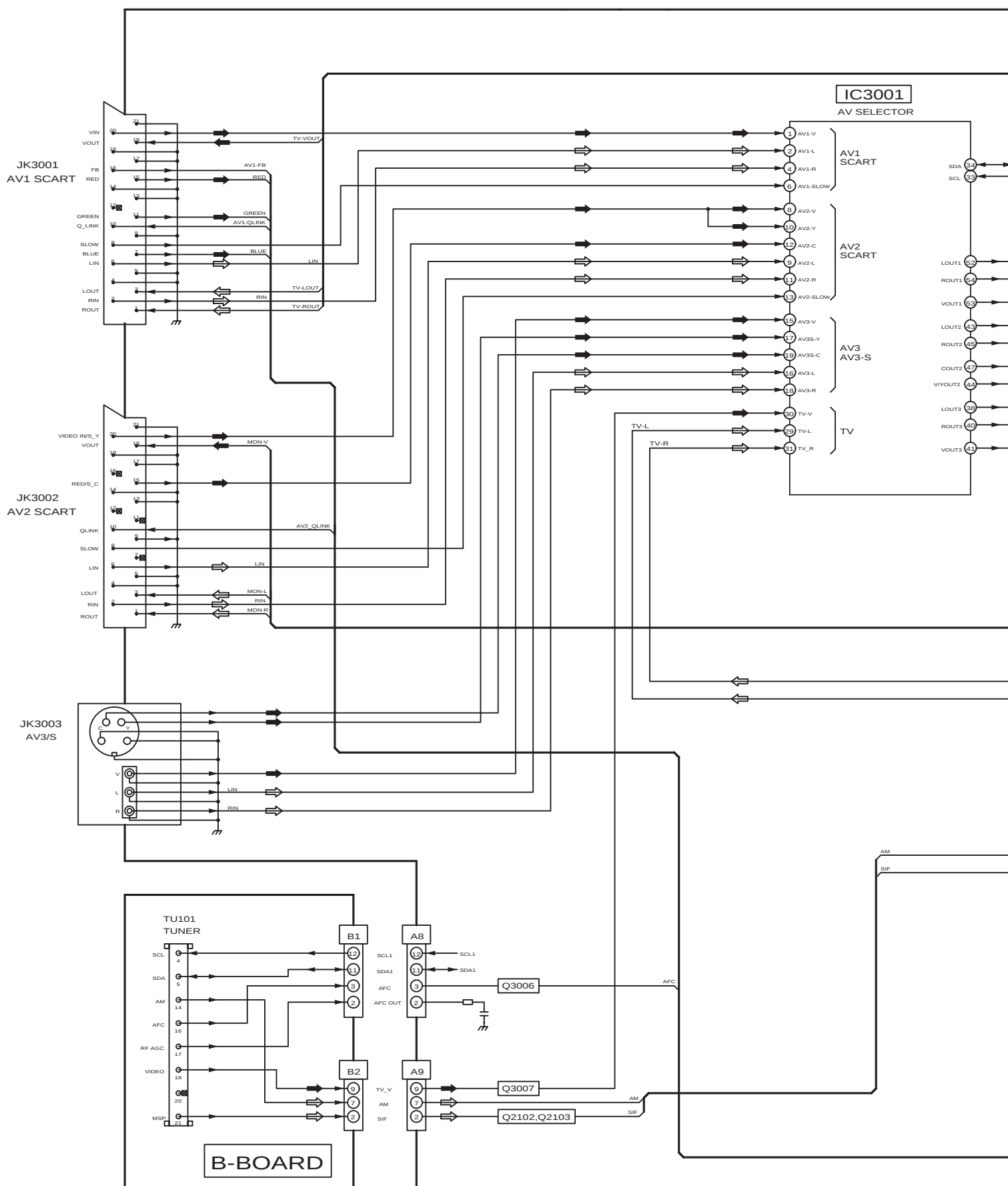
11.3. Power Block Diagram



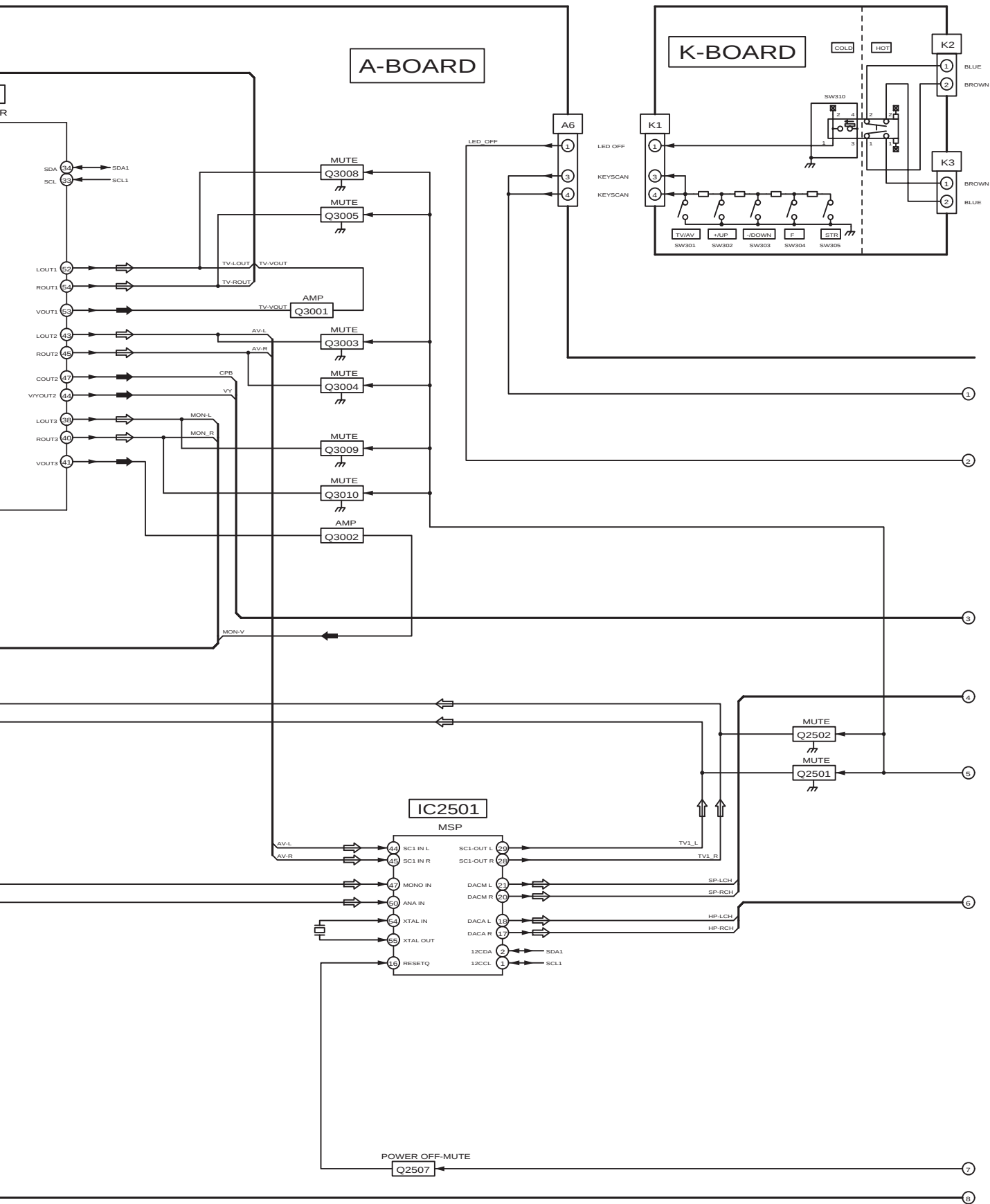
TX-22LX2
Power Block Diagram

TX-22LX2
Power Block Diagram

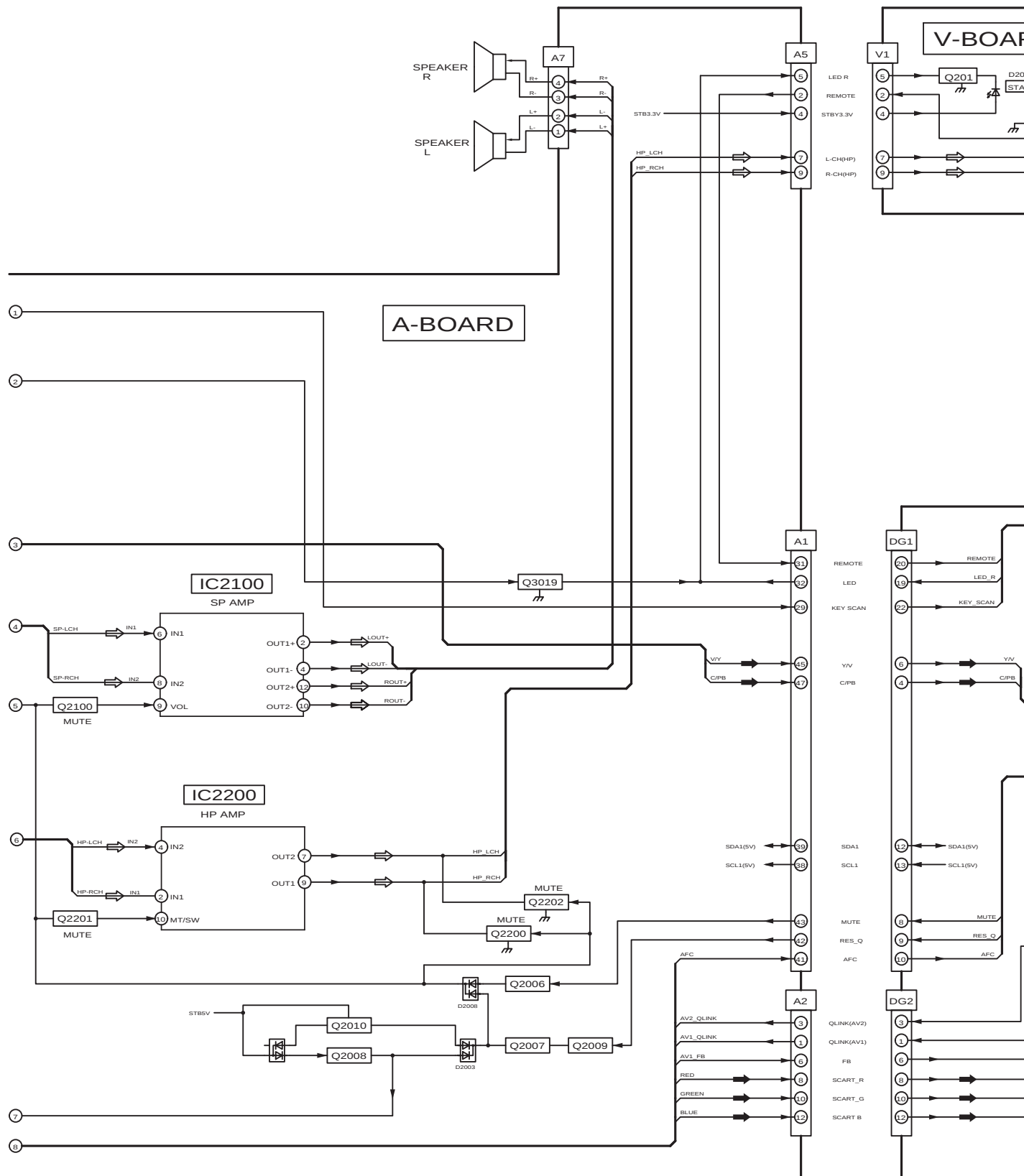
11.4. Signal Block Diagram



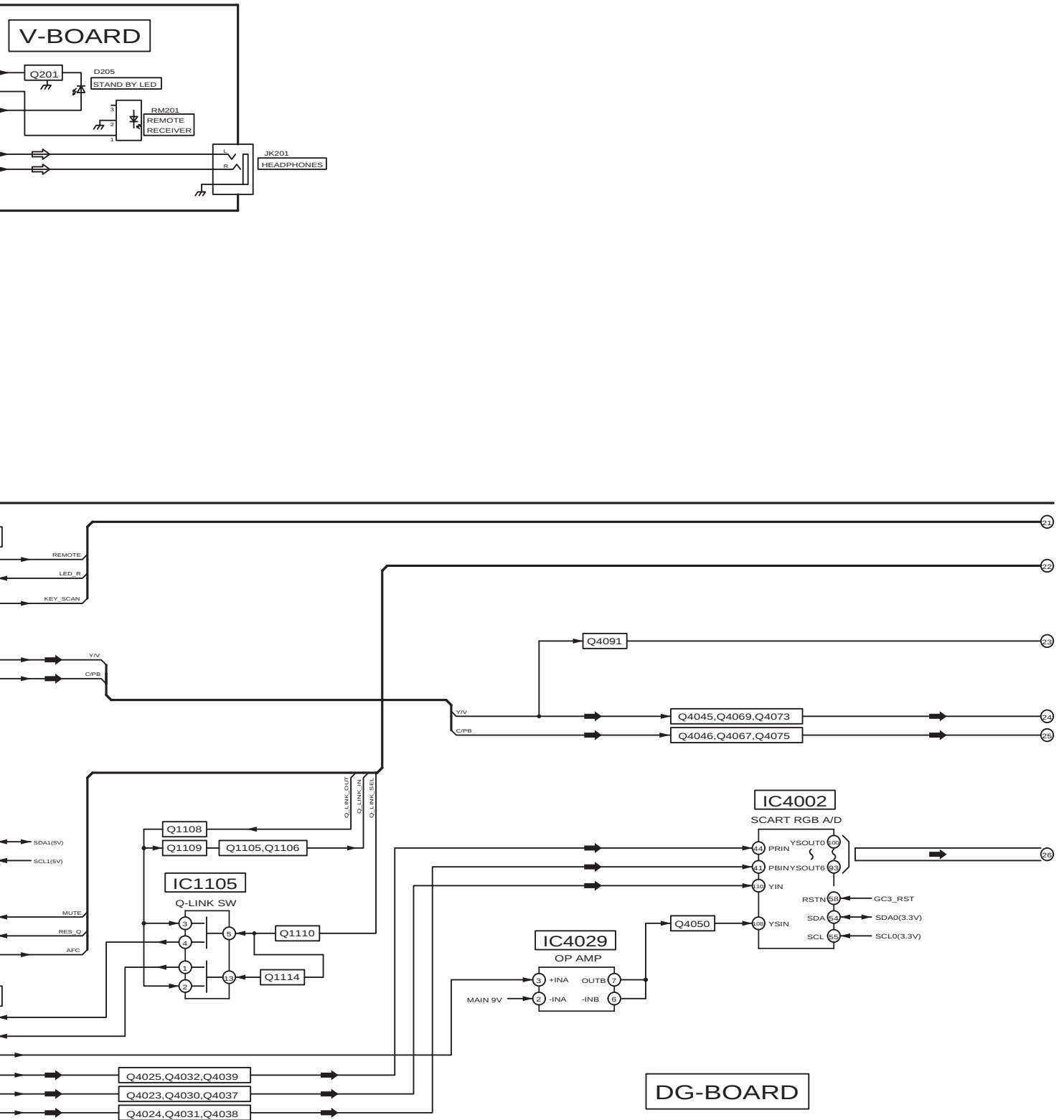
TX-22LX2
Signal Block Diagram

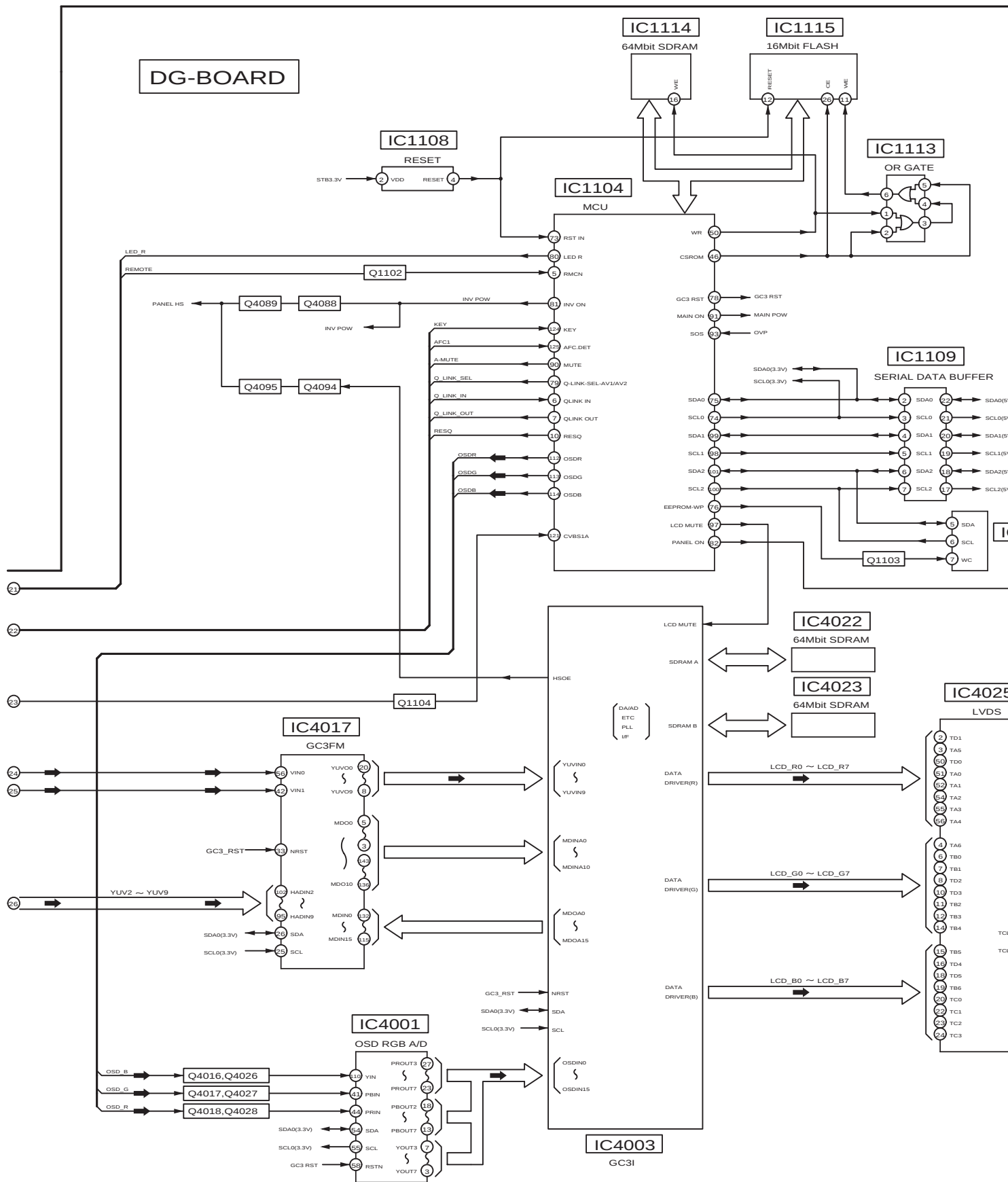


TX-22LX2
Signal Block Diagram

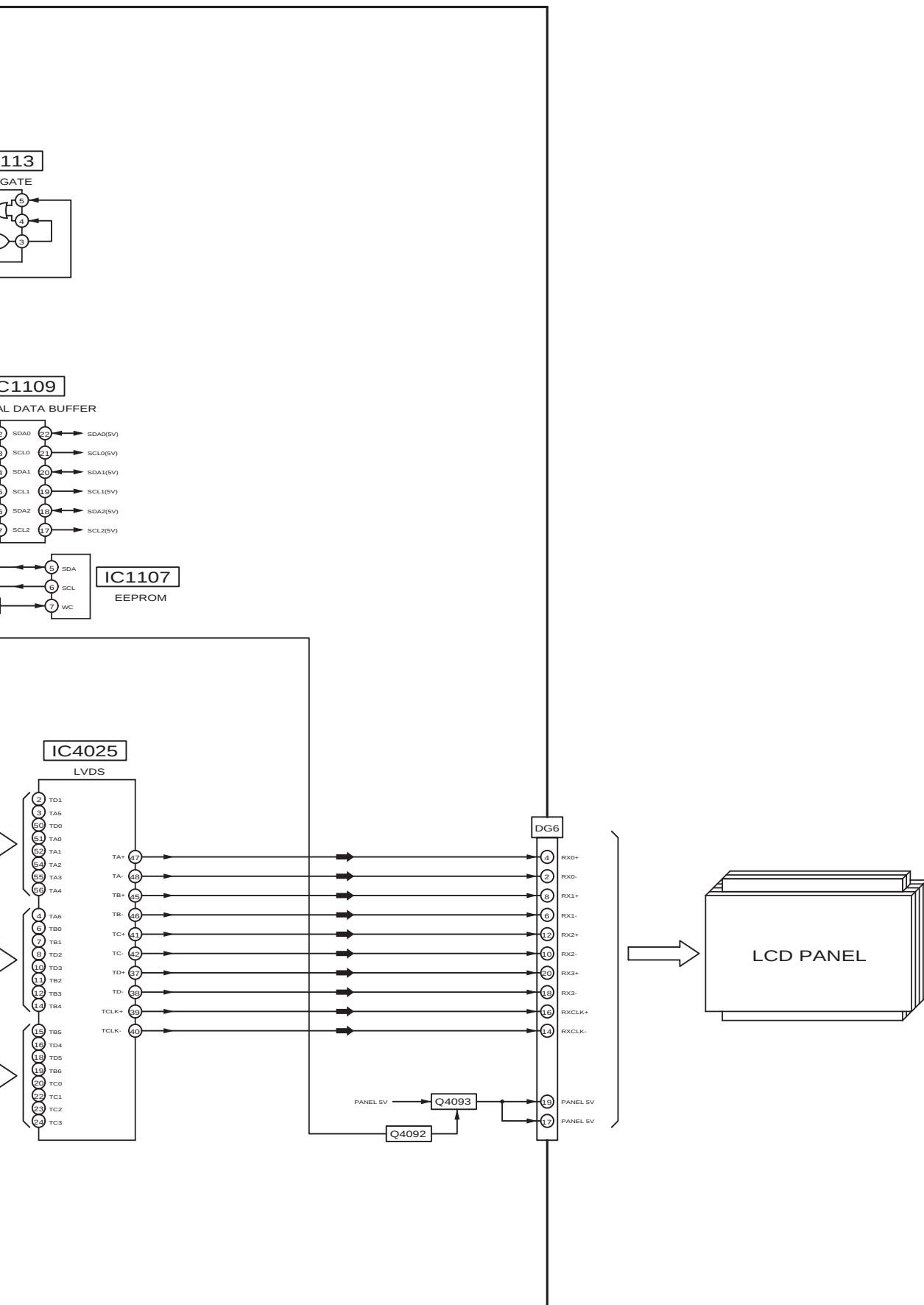


TX-22LX2
Signal Block Diagram

TX-22LX2
Signal Block Diagram

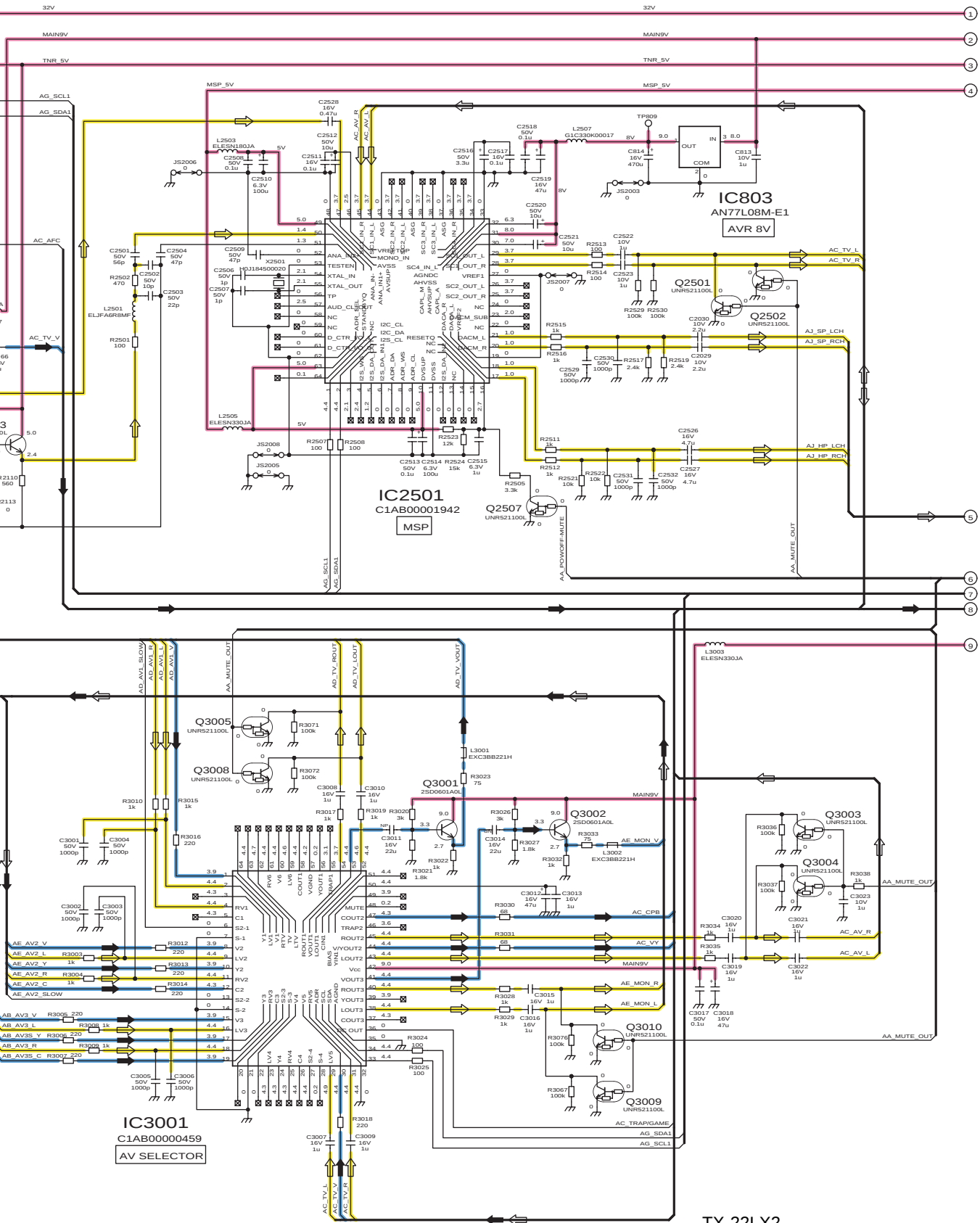


TX-22LX2
Signal Block Diagram

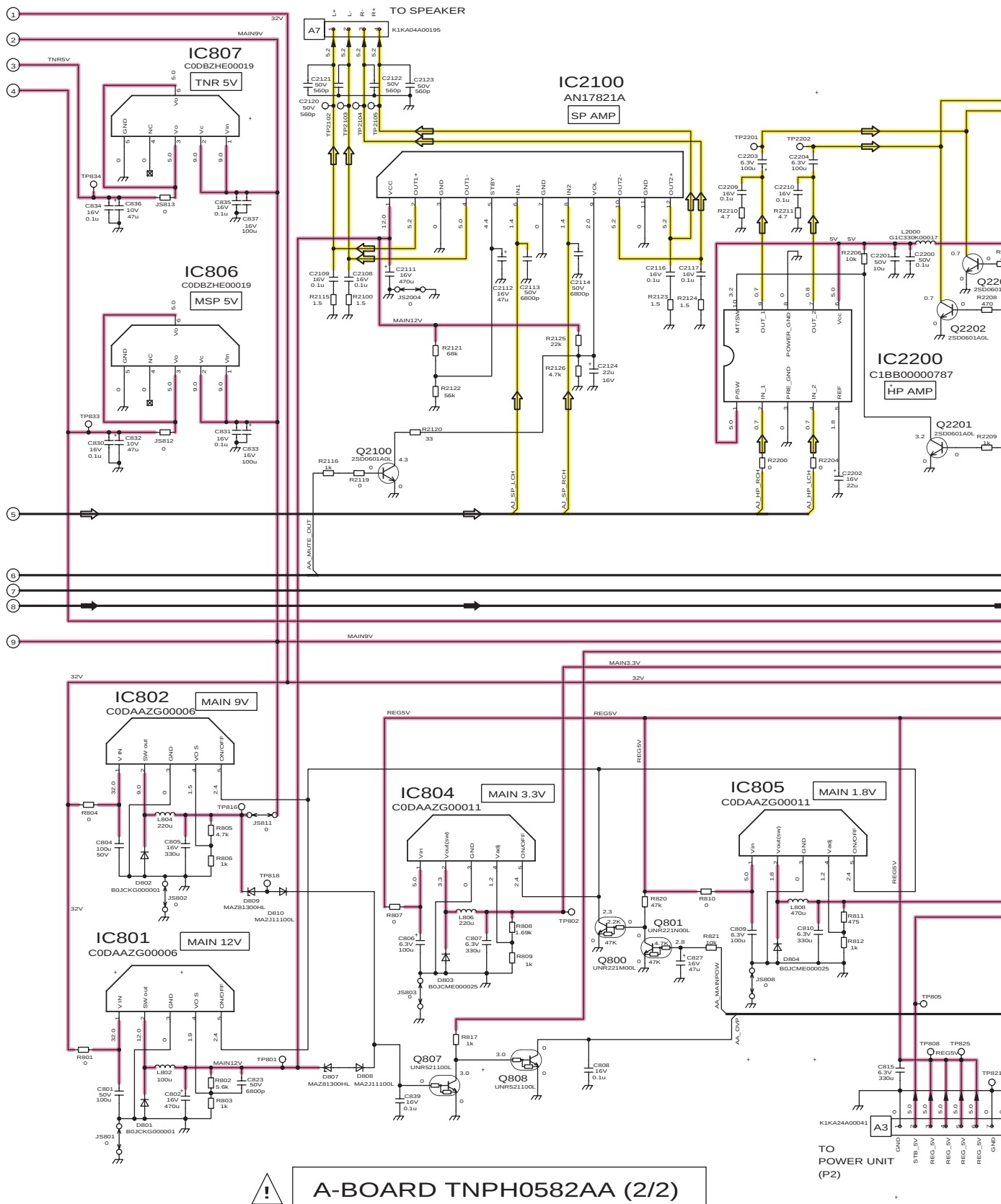


TX-22LX2
Signal Block Diagram



TX-22LX2
A-Board (1 of 2) Schematic Diagram

11.6. A-Board (2 of 2) Schematic Diagram



TX-22LX2
A-Board (2 of 2) Schematic Diagram

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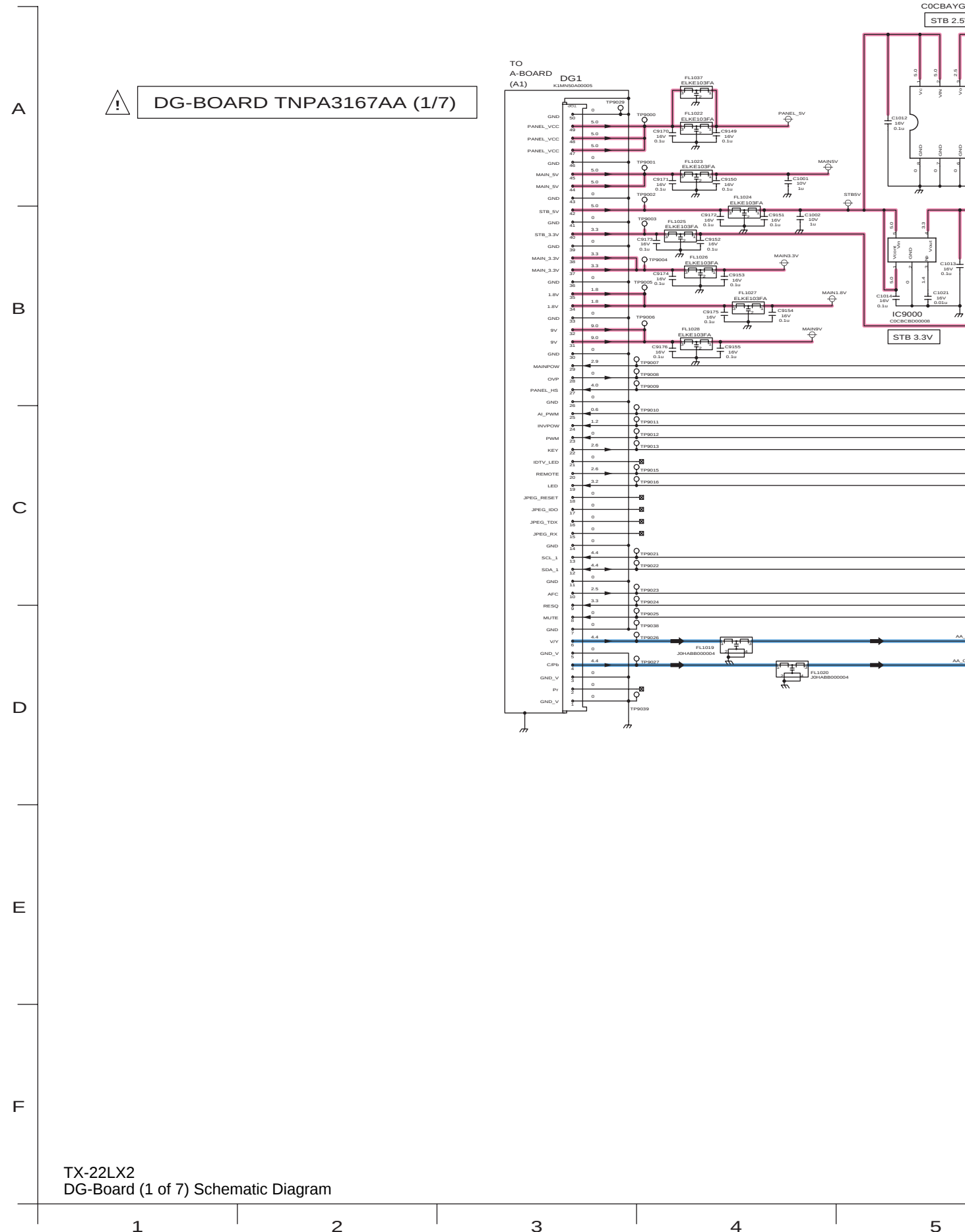
9

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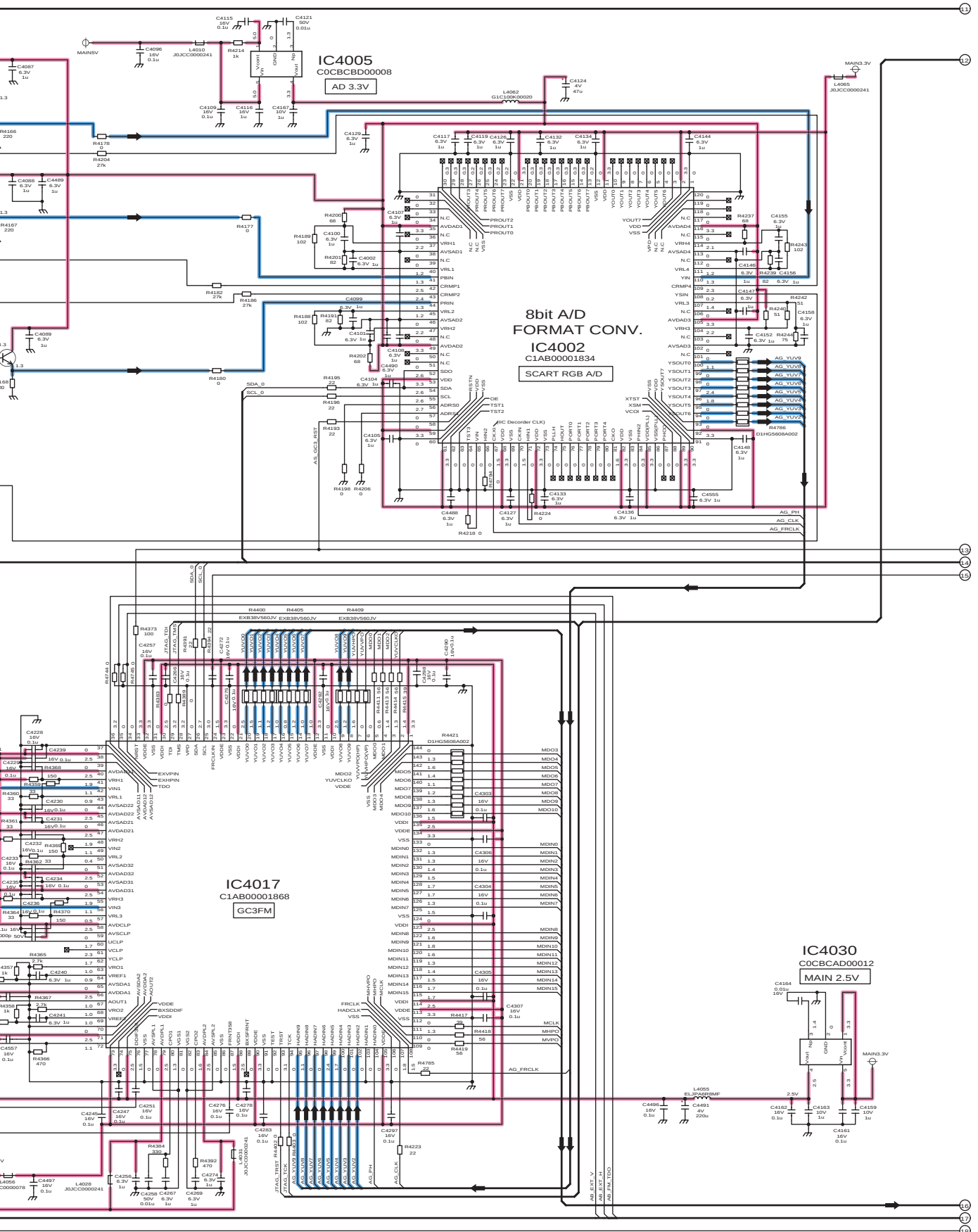
11

12

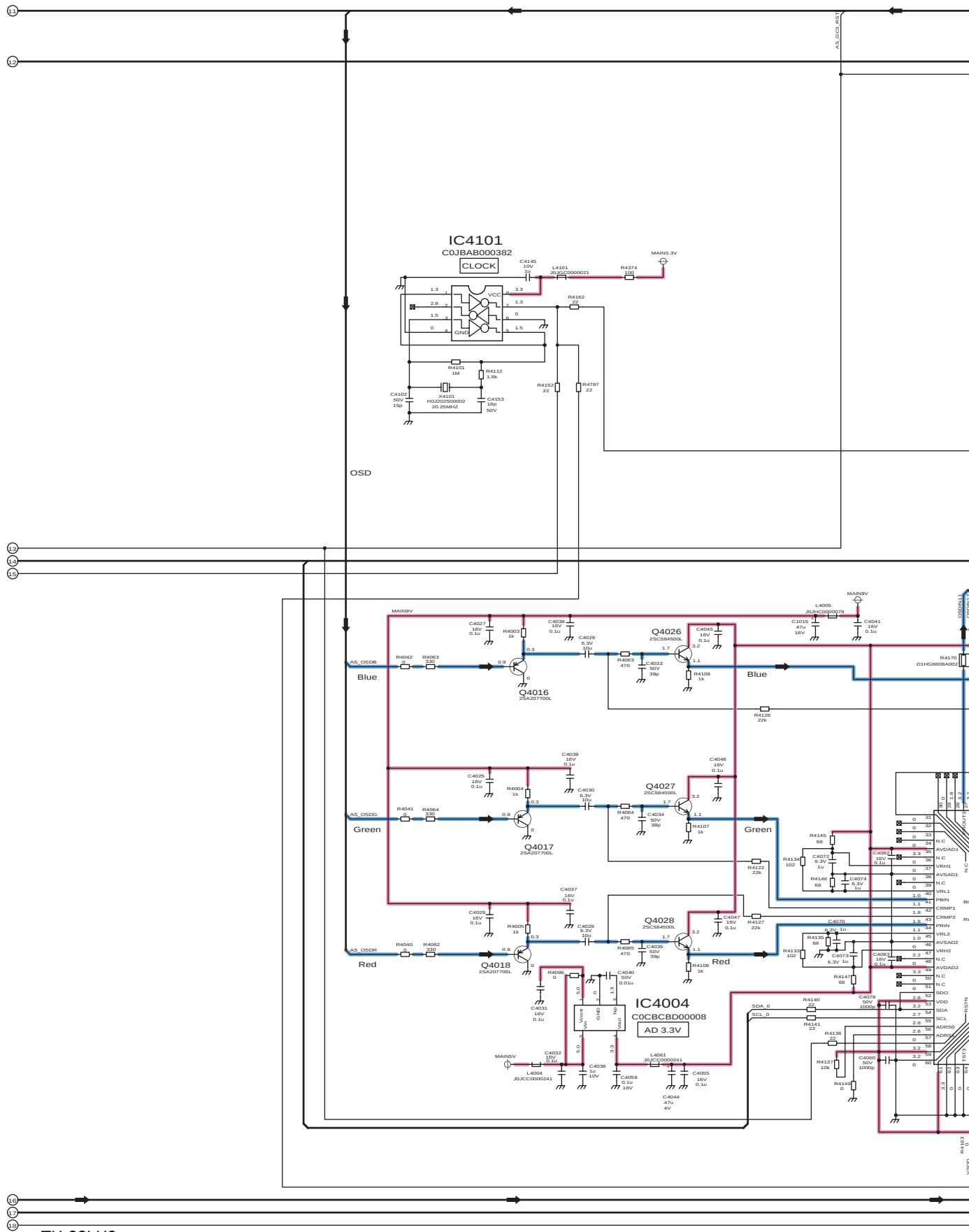
11.7. DG-Board (1 of 7) Schematic Diagram



TX-22LX2
DG-Board (1 of 7) Schematic Diagram



11.9. DG-Board (3 of 7) Schematic Diagram



TX-22LX2
DG-Board (3 of 7) Schematic Diagram

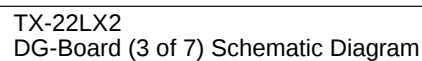
19

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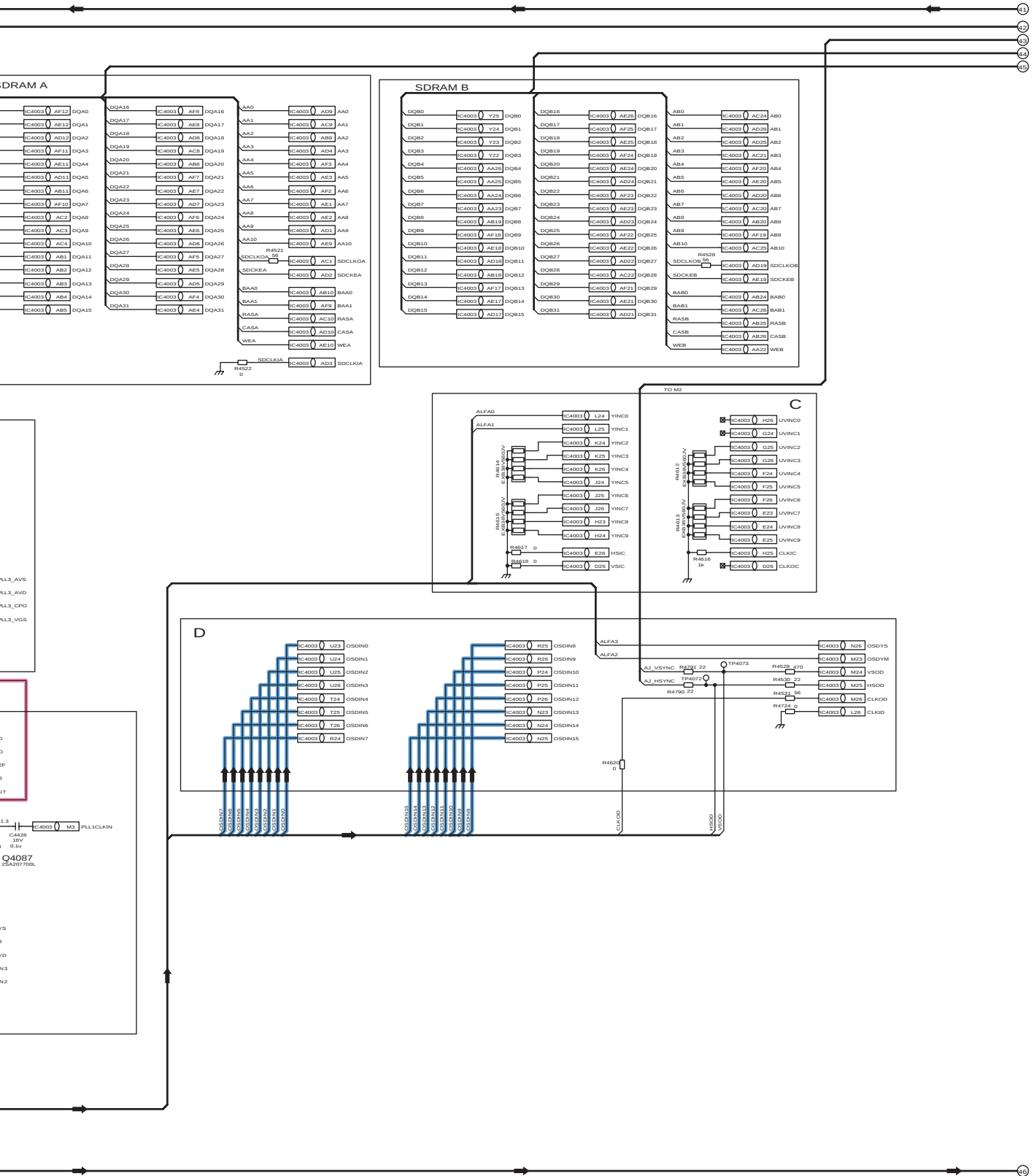
The diagram consists of three horizontal lines. The top line has three arrows pointing to the left, with small circles at their tails. The middle and bottom lines are empty.



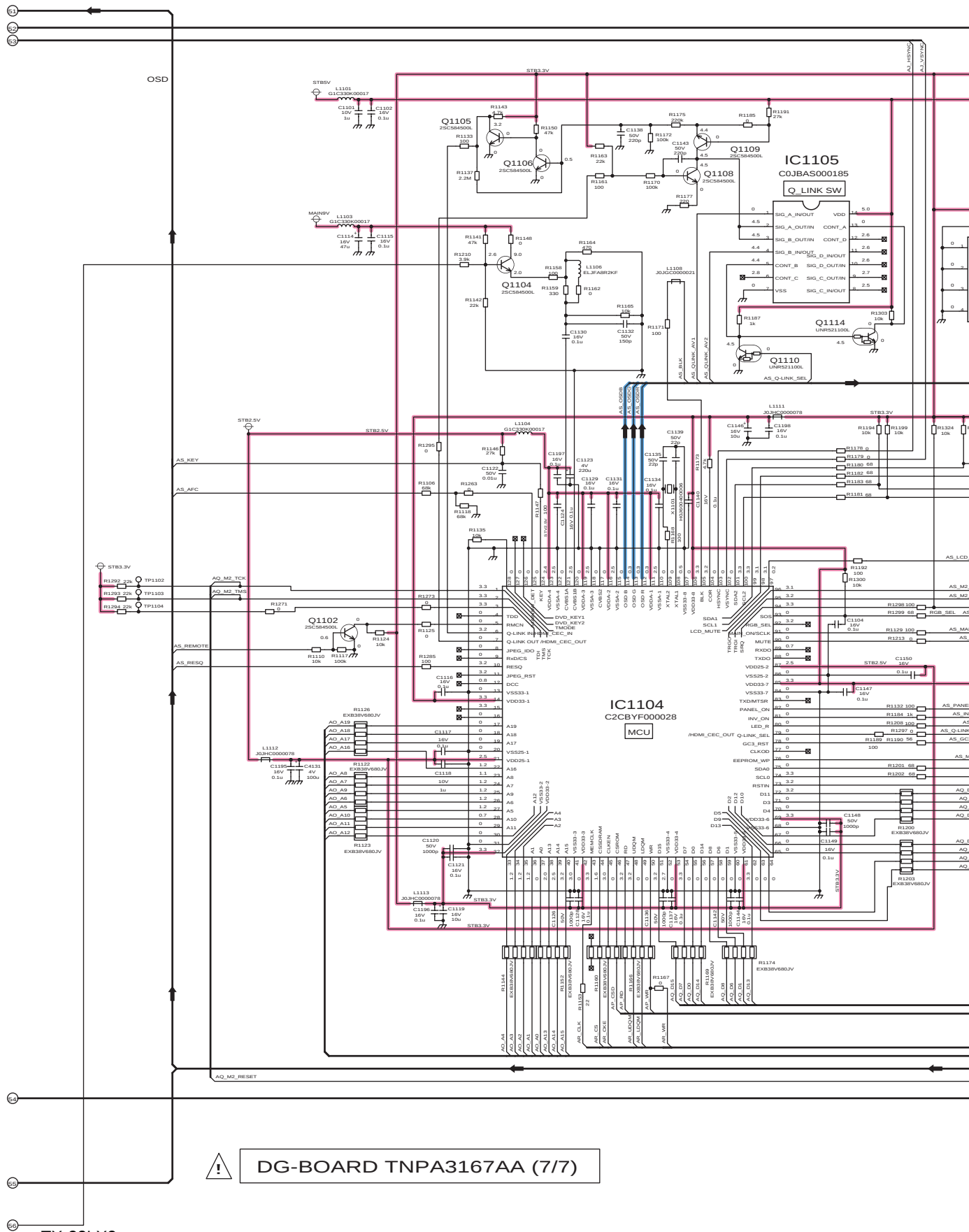
32



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11.13. DG-Board (7 of 7) Schematic Diagram



TX-22LX2
DG-Board (7 of 7) Schematic Diagram

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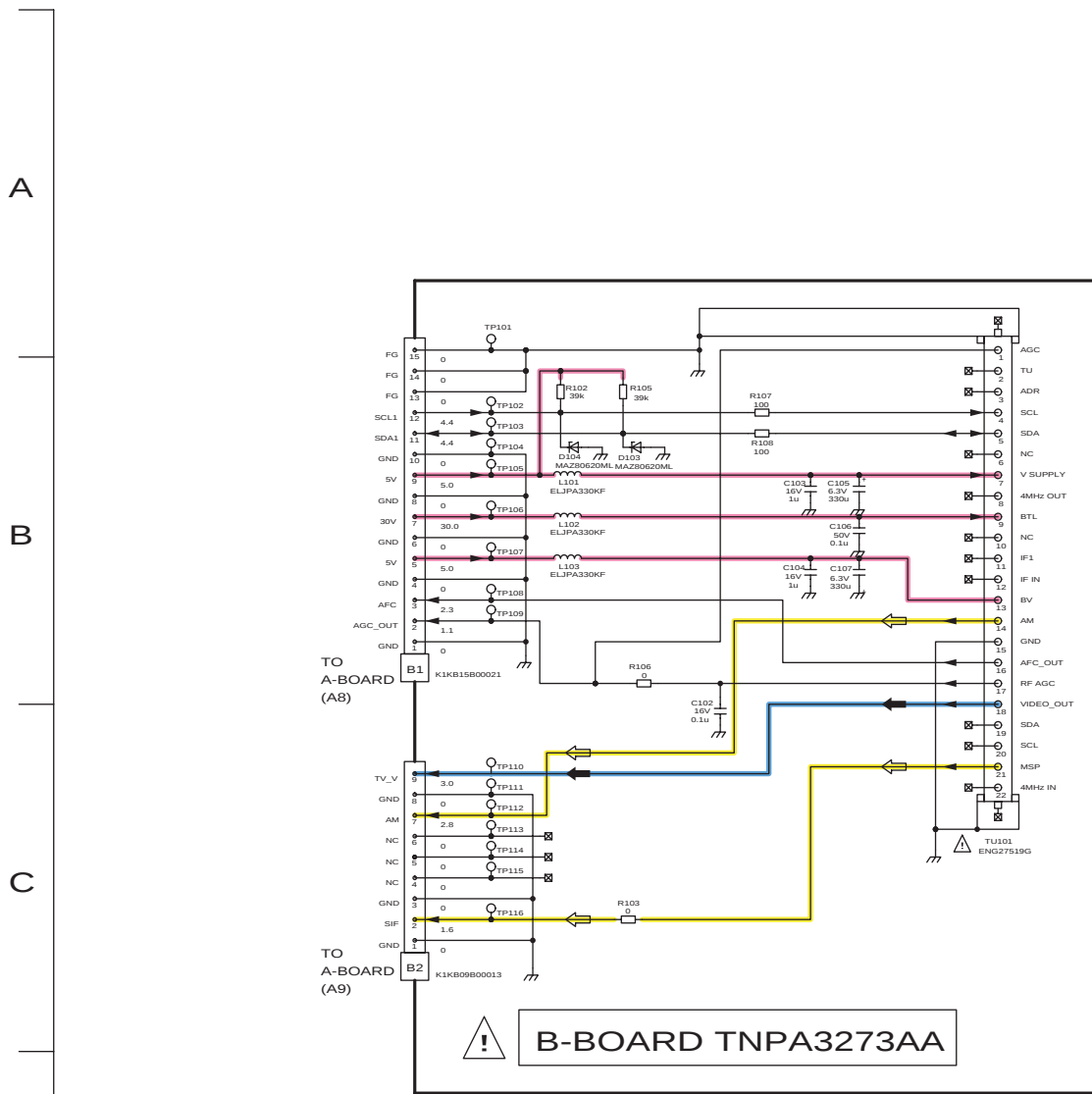
57

58

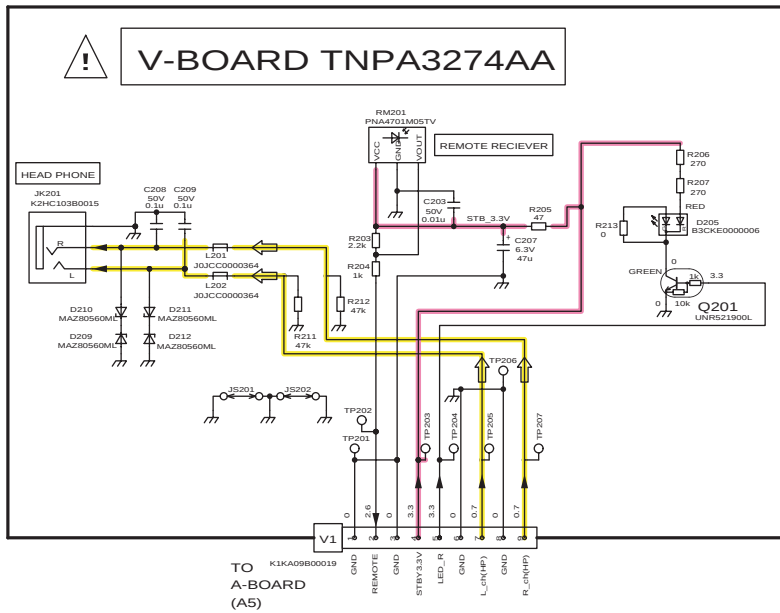
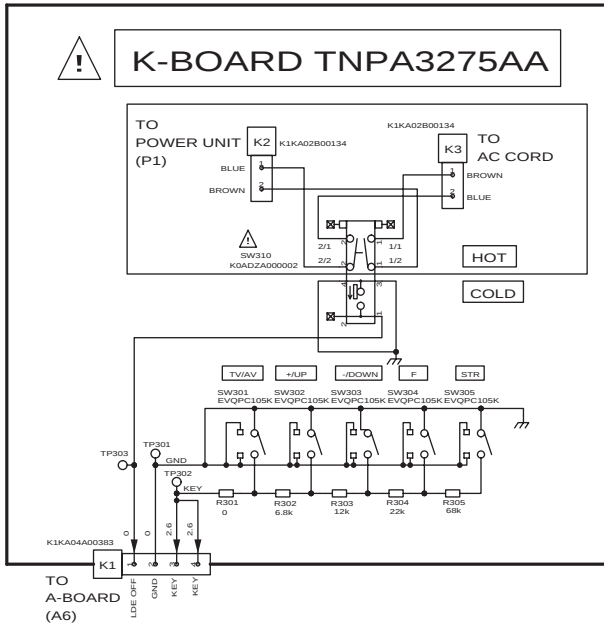
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TX-22LX2
DG-Board (7 of 7) Schematic Diagram

11.14. B, K, and V-Board Schematic Diagram



TX-22LX2
B,K and V-Board Schematic Diagram



TX-22LX2
B,K and V-Board Schematic Diagram

5

6

7

8